REMARKS

Status of the Claims

After entry of the instant amendment, claims 1, 3, 4 and 6-20 are pending in the present application. Claims 1 and 4 are independent.

Claims 2 and 5 have been cancelled without prejudice or disclaimer of the subject matter contained therein. Claims 1, 3, 4 and 6 have been amended and new claims 7-20 have been added, and the amended and new claims find support the Specification as filed. Thus, no new matter has been added by way of amendment to the claims.

Reconsideration of this application, as amended, is respectfully requested.

Priority under 35 U.S.C. § 119

Applicants thank the Examiner for acknowledging Applicants' claim for foreign priority under 35 U.S.C. § 119, and receipt of certified copies of the priority documents.

Information Disclosure Citations

Applicants thank the Examiner for considering the reference cited in the Information Disclosure Statements filed October 4, 2006; June 20, 2008; and April 20, 2009, and for providing Applicants with an initialed copies of the PTO-SB08 forms filed therewith.

Rejections under 35 U.S.C. §§ 102(b) and 103(a)

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Beroza and Kinman, "Sesamin, sesamolin, and sesamol content of the oil of sesame seed as affected by strain, location grown, ageing, and frost damage," JAOCS, Vol. 32, No. 6, June, 1955, pages 348-350 (hereinafter "Beroza") alone, or as further evidenced by The Merck Index, Stecher, P.G., ed., 1968, Merck & Co., Inc., Rahway, NJ, pages 943-944 (hereinafter "Stecher").

Claims 1-3 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Beroza alone or taken with Fukuda et al., "Contribution of lignan analogues to antioxidative activity of refined unroasted sesame seed oil," JAOCS, Vol. 63, No. 8, August, 1986, pages 1027-1031 (hereinafter "Fukuda"), and as further evidenced by Stecher.

Claims 5-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Menezes et al., "Sesame oil. II. Some chemical and physical properties of the oils from different varieties of sesame seed," JAOCS, Vol. 27, No. 5, May, 1950, pages 184-186 (hereinafter "Menezes") taken with Bailey's Industrial Oil and Fat Products, 5th Edition, Hui, Y.H., ed., Vol. 4, 1996, page 201 (hereinafter "Hui").

Claims 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Menezes taken with Hui, and further in view of Bailey's Industrial Oil and Fat Products, 4th Edition, Swern, D., ed., Vol. 2, 1982, pages 294-295 and 303 (hereinafter "Swern").

Claims 2 and 5 have been cancelled and their rejections are moot. The rejections of 1, 3, 4 and 6 are respectfully traversed.

At page 2 of the Office Action, it is alleged that Beroza discloses sesame seed oils having greater than 1% by weight sesamin and that although sesaminol is not mentioned by Beroza, "Beroza would not be expected to disclose sesaminol content where it was not found."

First, Applicants respectfully point out that the sesame seed oils taught by Beroza are not refined, as in the claimed invention. Beroza's oils are merely crude sesame seed oils prepared by cold-pressing and filtering of the exudate (page 348 of the Beroza reference). Second, Beroza specifies that the oils were analyzed only for the three compounds listed in Table 1 (*e.g.*, sesamin, sesamolin and sesamol) (page 348 of the Beroza reference). Third, the three components analyzed added together account for at most 1.5% of the total of each sesame seed oil examined by Beroza. Thus, greater than 98.5% of the constituents of each of the oils were not examined.

In addition, it is explained at page 5, lines 16-21 of the present application that sesaminol is formed by sesamolin via a transfer reaction during a bleaching step, when sesame seed oil is refined. Beroza does not teach bleaching sesame seed oil. As stated above the oils examined by Beroza are crude and unrefined. As Beroza does not teach refined sesame seed oils, the claimed invention is distinguished over Beroza.

At page 3 of the Office Action, it is alleged that Stecher (The Merck Index) teaches that sesame oil is bland and thus would not be expected to be bitter. While this may be true of some cold-pressed crude sesame seed oils and some highly refined sesame seed oils, it is well known that many sesame seed oils are bitter and that sesame seed oil that has little or no bitter taste can become bitter upon heating (*e.g.*, during bleaching or cooking) due to the reaction of components in sesame seed oil at increased temperatures (further discussed below).

The bitterness of the sesaminol is discussed at page 8 of the present Specification, where extracted (by HPLC) sesaminol was added to commercial salad oils. When the sesaminol was added to the salad oil at about 0.2 wt% or higher, the salad oil took on a harsh bitter taste (Table 2 of the present Specification).

The claimed methods are meant to maximize sesamin (which has medicinal properties) content and minimize sesaminol content in a sesame seed oil to produce a refined oil without a bitter taste. When a conventional refining method with a bleaching step (Example 1 of the present Specification) is used to refine sesame oil having relatively high levels of sesamin it results in high levels of sesaminol production and a bitter flavor.

Beroza and Stecher taken alone or together do not teach a refined sesame oil without a bitter taste comprising 1% by weight or more of sesamin and 0.2% by weight or less of sesaminol, wherein the refined sesame oil is prepared by a method comprising (a) extracting sesame oil from unparched sesame seed to produce an extracted sesame oil and (b) (i) bleaching the extracted sesame oil with activated carbon or (ii) bleaching the extracted sesame oil at a temperature from 5°C to 70°C with a clay, as in amended claim 1.

At page 3 of the Office Action, it is alleged that "[f]urther evidence for the no sesaminol in sesame seed is shown in Table 2 of Fukuda. Here two samples of sesamin [*sic*] seed oil do not contain sesaminol oil [*sic*]." Applicants respectfully disagree with this characterization of the teachings of Fukuda.

All of the oils in Table 2 of the Fukuda reference begin with crude oil 1, then as the oil is processed and refined it is analyzed after each step. Thus, oil 2 is produced after crude oil 1 is treated with alkali; oil 3 is produced after crude oil 1 is treated with alkali and washed with warm water; oil 4 is produced after crude oil 1 is treated with alkali, washed with warm water, and bleached; and oil 5 is produced after crude oil 1 is alkali-treated, washed, bleached, and deodorized.

The oils referred to in the Office Action as not containing sesaminol (oils 1-3 of Table 2 of the Fukuda reference) are crude and partially purified sesame seed oils (see the legend of Table 2), which have not been bleached. After bleaching oils 4 and 5 contain sesaminol. Further it should be noted that as the crude oil is refined by Fukuda, the amount of sesamin in the oil is steadily reduced, and none of the oils (especially the refined oils) taught by Fukuda contain greater than 1% by weight of sesamin, as in the claimed invention. Also in Table 3 of Fukuda all of the commercial

sesame seed oils A-F tested contained some sesaminol, which is not surprising because they were all refined (page 1029).

Further, Fukuda teaches at page 1030 that "[t]he results newly revealed show epimerization of (+)sesamin and catalytic conversion of sesamolin to sesaminol (a product of transformation) and its epimers." On the same page Fukuda notes "[t]he conversion of sesamolin to sesaminol in oil systems seems to be an acid-catalyzed reaction, involving scission and transformation of a C-C bond, and is also of interest as a chemical reaction, the details of which will be reported elsewhere." At page 1029, Fukuda describes an experiment where sesamolin was heated in vacuo at 90°C with 0.5 g acid clay for 1 hour, which resulted in the production of sesaminol from the sesamolin (Figure 5).

Finally, Fukuda teaches away from sesame seed oils with low levels of sesaminol (as in the claimed invention), where at page 1030, Fukuda notes that sesaminol and its epimer are the dominant antioxidant in refined sesame seed oil and that sesaminol "might be considered one of the most important natural antioxidants for food."

As Beroza does not teach refined sesame oils, and Fukuda does not teach refined sesame oil comprising 1% by weight or more of sesamin and 0.2% by weight or less of sesaminol, the combined teachings of Beroza and Fukuda do not teach every element of the claimed invention.

At page 4 of the Office Action, it is alleged that Menezes teaches use of 2% bleaching clay in the refining process. However, Menezes teaches the use of 2% bleaching clay at a temperature of 120°C. The claims, as amended, recite bleaching with clay at a temperature from 5°C to 70°C. Example 1, Comparative Example 2, and Comparative Example 3 of the present Application applied 2% by weight clay (*e.g.*, GSF, NV and TONSIL, respectively) at a temperature of 80°C, and all yielded unacceptably high levels of sesaminol (*e.g.*, 0.255%, 0.234% and 0.204%, respectively).

It is conceded at page 4 of the Office Action that Menezes differs from the claims in the recitation of the temperature for bleaching, and Hui is relied on as teaching that "there is no critical bleaching temperature for optimum bleaching results" and that "lower temperatures of 75-85°C are recommended for some activated earths." The recommended temperature range of 75-85°C lies outside the range of 5°C to 70°C used with bleaching with clay recited in the amended claims.

Further, Hui teaches that "bleaching is carried out uniformly at a temperature in the neighborhood of 105-110ºC" in most plants. Hui goes on to point out that there are different bleaching temperature optimums for cottonseed oil, soybean oil, red oil, and palm oil, and that the optimums also differ depending on the adsorbent used (page 201 of the Hui reference). Still further, Hui implies that the optimum bleaching temperature may be related to the bleaching effect the process is meant to achieve (*e.g.*, which colored components are present in the oil being bleached).

Hui does not teach the bleaching temperature optimum for sesame oil with different adsorbents. Hui does not teach bleaching sesame oil at a temperature from 5°C to 70°C with a clay, as in the amended claims, and arguably teaches away from the temperatures recited in the amended claims.

At page 4 of the Office Action, it is further alleged that "Swern teaches that activated carbon is the only alternative adsorbent used for treating fatty oils." However, Swern also teaches away from the use of activated carbon. At page 295, Swern states that "[b]ecause of its relatively high cost and its very high oil retention, carbon is rarely used alone on most vegetable oils."

Further, at page 303 Swern teaches that "bleaching is carried out uniformly at a temperature in the neighborhood of 195-230ºF [90.5-110ºC]" in most plants. Swern goes on to say that "[s]ome activated earths, however, yield slightly better results at a lower temperature; hence if the operation is carried out under vacuum, so that dehydration of the oil and earth constitutes no problem, temperatures as low as 170-180ºF [76.7-82.2ºC] are recommended."

Like Hui, at page 303 Swern also discloses the different bleaching temperature optimums for cottonseed oil, soybean oil, red oil, and palm oil, and that the optimums also differ depending on the adsorbent used. Swern also does not teach the bleaching optimum for sesame oil with different adsorbents. Swern does not teach bleaching sesame oil at a temperature from 5°C to 70°C with activated clay, as in the amended claims, and arguably teaches away from the temperatures recited in the amended claims.

Thus, Menezes, Hui and Swern, taken alone or together do not teach methods for the production of refined sesame oil without a bitter taste having at least 1% by weight sesamin and not more than 0.2% sesaminol comprising milling sesame seeds, extracting oil from the milled sesame seeds using solvent extraction, and bleaching the extracted sesame oil with activated

carbon or a clay to produce a refined sesame oil, wherein when the bleaching step is carried out with clay it is performed at a temperature from 5°C to 70°C, as in the amended claims.

In view of the discussion above, Applicants respectfully request that the rejections of claims 1, 3, 4 and 6 under 35 U.S.C. §§ 102(b) and 103(a) be withdrawn.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Stephanie A. Wardwell, Ph.D., Registration No. 48,025 at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,

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